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BOOK REVIEWS

The Fundamentals of Psychology. By W. B. PILLSBURY. New York, Macmillan, 1916, vii+562 pp.

The fundamentals of psychology, according to the preface, are "the results of experiment and the generally accepted body of facts" of the science. These facts can be stated without dogmatic reference to theory; indeed, theory is to be avoided save in so far as it illuminates fact or emphasizes problems. The introduction deals very briefly, therefore, with method and subject-matter. The method is two-fold. Observation, its objective and experimental side, gives the phenomena as they present themselves to the onlooker, and makes measurement possible. Introspection, or self-observation, gives the phenomena as they appear to the individual investigated. This side of method is apparently secondary: "it will in many cases supplement the results of direct observation;" "it is nearly always suggestive;" and it "may at times furnish a solution to the questions raised by objective results."

For subject-matter the author prefers the term behavior, because "consciousness tends to imply something removed from observation, something mystical," because "behavior is the more inclusive term," and because of "the doubt expressed by recent writers as to whether consciousness exists, at least exists for them individually." No one of these reasons seems logical, even on the writer's own showing. Why should consciousness tend to imply something removed from observation, when we are assured that "the second and third definitions [consciousness, behavior], are alike in that neither implies any theories concerning what is not open to observation?" We are not told how to understand the *inclusive* term behavior. It is defined as "the activity of man or animal as it can be observed from the outside, either with or without attempting to determine the mental states by inference from these acts." Another paragraph limits psychological study to "intelligent" behavior. The body of the book, however, deals specifically and continuously with consciousness and the "materials" of consciousness, and does not deal, explicitly at least, with behavior itself. Apart from the introduction, the author gives no indication that he wishes to deny the existence of consciousness. Except for its discussion of the kinds and fields of psychology, the introduction seems therefore as likely to confuse as to enlighten the student. On the basis of the statements in the preface, indeed, no introduction should have been necessary.

Two chapters deal with the nervous system in greater detail than is usual in text-books at the beginner's level. The treatment is clear and logically ordered; and the illustrations and schemata have the special merit of showing, for the most part, only such details as are made significant in the accompanying text. It is, however, not easy to see just what psychological facts are better understood from a knowledge of the gross and microscopical structure and development of the neurones, or from an ability to trace tracts in the cord and brain and to name and localize lobes and fissures and sensory areas;

and it is curious to note how infrequently the writer refers back in later chapters to these discussions, whether by page or less directly.

The remaining chapters treat of sensation (two), images and the laws of centrally excited sensations, attention and selection, perception (two), memory, reasoning, instinct, feeling and affection, emotion and temperament, action and will, and the self.

The writer's intention to draw freely upon the work of all schools finds expression throughout the book. It leads him in many cases to state rival opinions, rather than to attempt selection and reconciliation. In vision a 'four-color' theory is found necessary, but the Hering, Helmholtz, and Ladd-Franklin theories are all detailed and partially criticized. In addition the views of Köhler, Révész, Meyer, Shambaugh, Helmholtz and others are given, and reconciliation is found difficult or impossible. The doctrines of perseverance and of actual synaptic connection are accepted in explaining memory and association. On the structural side, attention is treated as a complex state involving many different changes; on the functional side, it appears to be the equivalent of selection or of "importance for consciousness." It is explained as a preparation of special neural tracts. A very general empirical (genetic) theory of space perception is accepted—space is said to offer no problems for the nativist—but although special theories are outlined, no serious attempt is made to estimate their adequacy as explaining the total body of facts. Both after-images and retinal streaming are discussed as explanations of the perception of movement, and the former is held to be at present the more probable. Motor and attentional theories, taken together, explain rhythm; and rhythm, strain and memory explain the perception of time at large, according to the duration of the objective interval. The theories of immediate quality and of association are discussed as the explanation of recognition; the author leans toward the latter. A special point is made of recognition as a stage in the development of meaning. Meaning itself may be imageless, and yet conscious. When imageless, it is to be explained as due to a subliminal arousal of appropriate associative tendencies. Instincts are nervous dispositions like the selective tendencies in attention, but generally of wider scope. Affection as sensation and as attribute is criticized; plural theories are discussed and rejected; pleasantness and unpleasantness as the sole qualities are accepted. Lipps' and Stout's theories are mentioned, and emphasis is placed upon the apperceptive doctrine of Wundt and its physiological correlate, though in the end it is maintained that the facts cannot be brought to harmonize with any general statement. The views of Darwin, of McDougall and of James and Lange, and the experiments of Sherrington and Cannon upon emotion are discussed, but only a very general summary is attempted. Thorndike's and Watson's theories of learning are outlined; and Barret's and Michotte's theories of will are compared, to the advantage of the former.

On the side of fact a number of inaccuracies may be mentioned. For example, the color-pyramid is not taken entirely as a psychological, but also as a physical and a physiological construction. It is said to represent the spectral colors and the purples, and the writer neglects the fact that after-image colors of better saturation than those of the spectrum are possible. Perhaps for this reason the *green* and *yellow* corners are said to be represented as higher than the other two, though the figure raises only the yellow and depresses the blue. The square base does not either represent the facts of complementarism. The

(physiologically) primary colors are not, as stated, red and green, but a red outside the spectrum and a decidedly bluish green. In audition 30,000 to 50,000 is given at the highest rate at which vibrations can be heard. Thus both the fact that beyond these rates noise is still heard, and the fact that musical quality (according to Köhler) ends at approximately 20,000, are neglected. Köhler is also inaccurately stated to identify musical quality with vocality. Combinational tones are said to be entirely of subjective origin, and beats are said to be carried by an intermediate tone, which is only sometimes the case. Rubin's finding of paradoxical warmth is not mentioned. We are not told why the difference-limens are to be regarded, not as constant values obscured by varying conditions, but as fundamental differences due to differences between individuals, nor how this view is related to present theory of psychometric functions. Eight, and not six, single metronome beats without rhythm are said to limit the range of attention. Ebbinghaus is quoted as having found every repetition to produce the same effect in memory; but Ebbinghaus' own qualifications in the case of large numbers of repetitions, and the qualifications of others with regard to the first few repetitions (Meumann's first stage of learning), are not added. Without apparent justification Jost's law is interpreted to mean that associative tendencies actually grow *stronger* (not merely 'set') for some time after learning, and the author represents the curve of forgetting as a resultant of a *rising* curve of association and a rapidly falling curve of perseveration. Ebbinghaus' explanation of Jost's law is not mentioned, and Ebbinghaus' discussion of "slowly learn, slowly forget" is by no means adequately presented. It is stated that nonsense-material is no more easily recognized than recalled, and that recognition always comes when associates are aroused. Heine's demonstration that different factors are involved in recognition and in recall is not mentioned.

The author's generalizations are not always in accord; we have had instances of this in the introduction. For instance: "All the materials of our consciousness are derived from sensation," and "It [affection] is not a mere attribute or phase of the sensation as are quality and intensity; rather we must regard it as a separate mental state or process with attributes of its own": "One can obtain grey, . . . only by the mixture of complementary colors," and "All lights of low intensity appear colorless." "The [totally color-blind] sufferer sees no colors, but only greys," "The sensation [under adaptation] begins to diminish in intensity . . . till all colors disappear": "There is a large number of odors, . . . each of which probably has its own sense organ" and "A case might be made out for separate taste buds for each quality; there is slight evidence for separate organs for each odor": "While each of these processes [feeling, pain, movement], together with taste, mixes with odors to produce a percept that is not immediately analyzable, they do not constitute true odors," and "The only perception that approximates the bare combination of sensations into a larger or more complicated whole is the tonal fusion."

These inaccuracies, of course, appear as minor matters when compared with the general success of the author in assembling the varied results of experimental investigation. The lack of 'system' and catholicity of treatment have their own advantages. Open-mindedness and breadth of view may be favored, but so may also confusion and failure to establish for the student a background from which to criticize the new and the common-sensible. Certainly the author has not been led by his principles to a marked avoidance of theories.

W. S. FOSTER.